WHAT IS CLAIMED IS:

1. A semiconductor device comprising:

an optical transmission region; and

a light receiving part for converting light propagating through the optical transmission region to an electrical signal,

wherein the optical transmission region comprises a two-dimensional optical waveguide layer, and wherein at least a portion of the light receiving part is embedded in the optical transmission region.

2. The semiconductor device according to claim 1, wherein an electric wiring layer is stacked on the optical transmission region.

3. The semiconductor device according to claim 1, wherein the light receiving part is embedded in the optical transmission region such that the light receiving part can directly receive light propagating through the two-dimensional optical waveguide layer.

4. The semiconductor device according to claim 1, wherein the light receiving part is embedded such that the light receiving part can receive light propagating within a plane of the two-dimensional optical waveguide layer without directivity.

5. The semiconductor device according to claim 1, wherein the at least a portion of the light receiving part embedded in the optical transmission region has a spherical surface.

6. The semiconductor device according to claim 1, wherein the light receiving part includes a spherical device.

7. The semiconductor device according to claim 1, wherein a portion of a light emitting part for transmitting light to the optical transmission region is embedded in the optical transmission region.

8. The semiconductor device according to claim 2, wherein the optical transmission region is interposed between the electric wiring layer located on the optical transmission region and another electric wiring layer located under the optical transmission region, and wherein at least a portion of the electric wiring layer is electrically connected to at least a portion of the another electric wiring layer by a via hole for penetrating the optical transmission region.

9. The semiconductor device according to claim 2, wherein at least one of O/E conversion or E/O conversion between an electronic device provided on the

electric wiring layer and the optical transmission region is performed using a spherical device.

10. An optoelectronic board comprising at least two layers consisting of a first layer and a second layer, the first layer including the electronic device, the optical device and an electric wiring for coupling the electric and optical devices, and the second layer including a two-dimensional optical waveguide, wherein the optical device comprises a light receiving part for receiving optical waveguided through the two-dimensional optical waveguide, and wherein at least a portion of the light receiving part is embedded in the two-dimensional optical waveguide.

11. The optoelectonic board according to claim 10, wherein the two-dimensional optical waveguide has a sheet-shaped form.

12. The optoelectronic board according to claim 10, wherein the light receiving part has a spherical structure, the light receiving part is mounted from a surface of the substrate such that the light receiving part is embedded in the optical waveguide, and the light receiving part is coupled with the electric wiring on the surface of the substrate.

13. The optoelectronic board according to claim 10, wherein the optical device is provided with a light receiving part and an electric circuit for driving the light receiving part or amplifying an electric signal obtained.

14. The optoelectronic board according to claim 10, wherein a light source of the optical device has a spherical shape, is mounted on the substrate from a surface thereof such that the light source embedded in the optical waveguide of the substrate, and coupled with the electric wiring on the surface of the substrate.

15. The optoelectronic board according to claim 10, the substrate further comprising: a transmission device for transmission having a spherical structure; and a parallel signal line, wherein an output terminal of the parallel signal line is coupled with the transmission device for transmission, and wherein the transmission device for transmission conducts parallel/serial conversion and sends a serial optical signal to the two-dimensional optical waveguide.

16. The optoelectronic board according to claim 15, wherein the serial optical signal is received by the light receiving part embedded in the two-dimensional

optical waveguide, converted to an electric signal, subjected to serial/parallel conversion by an electronic circuit simultaneously formed on the light receiving part and transmitted to the parallel signal line.

17. The optoelectronic board according to claim 10, wherein the optoelectronic board is made of a flexible substrate material.

18. An optoelectronic integrated circuit comprising an electronic device and optical device integrated on a surface of a spherical semiconductor substrate, wherein the optical device is a light receiving element includes a multi-layer film containing a pn junction, the electronic device includes at least a bias circuit for applying a reverse bias to the light receiving element, and an amplifier for amplifying a signal obtained by converting a received light to an electric signal.

19. The optoelectronic integrated circuit according to claim 18, wherein at least a portion of the light receiving element is embedded in an optical transmission medium.

20. The optoelectronic integrated circuit

according to claim 18, wherein the spherical semiconductor substrate is made of an Si single crystal.

21. The optoelectronic integrated circuit according to claim 18, wherein the spherical semiconductor substrate is made of a GaAs single crystal.

22. The optoelectronic integrated circuit according to claim 18, wherein the multi-layer film of the light receiving element is made of p-Si, i-Si and n-Si.

23. The optoelectronic integrated circuit according to claim 18, wherein the multi-layer film of the light receiving element is made of p-GaAs, GaAsN and n-GaAs.

24. A method of producing the optoelectronic integrated circuit according to claim 18, which comprises forming the multi-layer film of the light receiving element by ion implantation.

25. An optoelectronic integrated circuit comprising an electronic device and optical device integrated on a surface of a spherical semiconductor substrate, wherein the optical device is a light

emitting element includes a multi-layer film containing a pn junction in a radial direction of the spherical semiconductor substrate, and the electronic device comprises a bias circuit that applies a forward bias to said light emitting element.

26. The optoelectronic integrated circuit according to claim 25, wherein at least a portion of the light emitting element is embedded in an optical transmission medium.

27. An optoelectronic integrated circuit comprising an electronic device and optical device integrated on a surface of a spherical semiconductor substrate, wherein the optical device is formed by flatting a portion of the surface of the spherical semiconductor substrate and thereby exposing a plurality of small planes, and stacking a multi-layer film containing a pn junction on the small planes, and the electronic device includes at least a bias circuit for applying a reverse bias or a forward bias thereto.

28. The optoelectronic integrated circuit according to claim 27, wherein the optical device is embedded in an optical transmission medium.

29. The optoelectronic integrated circuit

according to claim 27, wherein the spherical semiconductor substrate is made of an Si single crystal.

30. The optoelectronic integrated circuit according to claim 27, wherein the spherical semiconductor substrate is made of a GaAs single crystal.

31. The optoelectronic integrated circuit according to claim 27, wherein the spherical semiconductor substrate is made of an InP single crystal.

32. The optoelectronic integrated circuit according to claim 27, wherein the spherical semiconductor substrate is made of a GaN single crystal.

33. The optoelectronic integrated circuit according to claim 27, wherein the multi-layer film containing the pn junction is composed of p-(Al, Ga)(As, P, N), i-(Al, Ga)(As, P, N), n-(Al, Ga)(As, P, N).

34. A method of producing the optoelectronic integrated circuit according to claim 27, comprising the steps of flattening a portion of a surface of the spherical semiconductor substrate, exposing a plurality of small planes, and stacking a multi-layer film

containing a pn junction on the small planes in the radial direction, a region other than the small planes on the surface of the spherical semiconductor substrate is covered with a dielectric film, and the multi-layer film containing the pn junction is selectively stacked only on the small planes by organic metal epitaxial growth or gas source molecular beam vapor deposition.

35. A method of producing the optoelectronic integrated circuit according to claim 34, wherein the small planes obtained by flattening a portion of the surface of the spherical semiconductor comprises crystal planes equivalent to one another in terms of crystal engineering or chemically similar to one another.